CATALOG DOCUMENTATION
EMAP - ESTUARIES PROGRAM LEVEL DATABASE
1991 FISH SPECIES DATA

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1. DATA SET IDENTIFICATION

  1.1 Title of Catalog Document

    EMAP-Estuaries Program Level Database
    1991 Virginian Province
    1991 Fish Abundance, Composition and Length Data Summarized for each
     Taxon Collected at a Station

  1.2 Authors of the Catalog entry

    Charles Strobel, U.S. EPA NHEERL-AED
    Melissa Hughes, OAO Corporation

  1.3 Catalog revision date

    1 April 1996

1.4 Data set name

FISHSPEC

1.5 Task Group

Estuaries

1.6 Data set identification code

00026

1.7 Version

001

1.8 Requested Acknowledgement

If you plan to publish these data in any way, EPA requires a standard statement for work it has supported:

"Although the data described in this article have been funded wholly or in part by the U. S. Environmental Protection Agency through its EMAP-Estuaries Program, it has not been subjected to Agency review, and therefore does not necessarily reflect the views of the Agency and no official endorsement should be inferred."

2.   INVESTIGATOR INFORMATION

2.1 Principal Investigator

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2.2. Investigation Participant-Sample Collection

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3.   DATA SET ABSTRACT

3.1 Abstract of the Data Set

The Fish Species data set is a synopsis of one successful standard trawl conducted at a station. The total count of individuals of each fish taxon caught in the standard trawl is reported. The length (mm) of up to 30 individuals caught in a standard trawl was measured, according to protocol. If there were two or more individuals of a taxon, the mean length and standard deviation of the mean were calculated. The length is reported for an individual.   A count of pathologies observed on all individuals of a taxon may be summarized for up to four (4) categories:

body, ocular, branchial and buccal. Each taxon is identified by a unique code which can be cross-referenced to the taxon phylogeny.

3.2 Keywords for the Data Set

Species abundance, species composition, species mean length, taxon abundance

4.   OBJECTIVES AND INTRODUCTION

4.1 Project and Investigation Objective

The Environmental Monitoring and Assessment Program (EMAP) was designed to periodically estimate the status and trends of the Nation's ecological resources on a regional basis. EMAP provides a strategy to identify and bound the extent, magnitude and location of environmental degradation and improvement on a regional scale based on randomly located station sites.

4.2 Data Objective

The objective of the Fish Species data set was to collect information to characterize fish assemblages in the estuaries of the Virginian Provinces.

Only the randomly located Base Sampling Sites (BASE) are included in this data set.

3.3 Background Discussion

Estuarine fish have economic, recreational, and ecological value. Some are harvested; others serve as forage for predatory organisms that have great aesthetic value (e.g., birds, sport fish, mammals). Most fish species hold a position near the top of the food chain. The impact of anthropogenic activities on fish concerns the public.

There are several advantages to using fish as potential indicators of estuarine condition. Because of their longevity and dominant position at the upper end of the food web, fish responses integrate many short-term and small-scale environmental perturbations. Fish are known to respond to most of the major environmental perturbations of concern in estuaries, including eutrophication, habitat modification and pathogenic or toxic contamination. Eutrophication can affect fish adversely by reducing dissolved oxygen below levels that are critical for growth or survival. Habitat modification, such as the loss of submerged aquatic vegetation, has been linked to decreased fish productivity through loss of important nursery areas. Toxic and pathogenic contaminants can decrease fish growth, reproduction or survival and can make fish unsafe for human consumption. Fish also are valuable as indicators because of their importance for determining the public perception of estuarine quality.

Factors controlling species composition and abundance of estuarine fish communities are complex and not well understood. However, most fish ecologists agree that the assemblage of fish that occurs at a sampling

site is affected by water and sediment quality parameters, including contaminant concentrations and inputs, and habitat conditions. For example, polluted sites are thought to contain less diverse and less stable fish assemblages than unpolluted sites and are dominated by pollution-tolerant species, such as mummichogs and carp. The degree to which information on fish community composition can be used to assess the status of estuarine environments on regional scales is unknown. A major purpose of evaluating fish community composition was to determine whether regional scale information on fish community characteristics could be used as indicator of environmental quality. If fish community data could be used in this manner, it would be particularly meaningful to a broad range of audiences, especially the public.

4.4 Summary of Data Set Parameters

The raw data for species composition, abundance and length were recorded in the field after the completion of one successful standard trawl. Body pathologies observed by the field crew were recorded, but are not presented here.

5. DATA ACQUISITION AND PROCESSING METHODS

5.1 Data Acquisition

5.1.1 Sampling Objective

Conduct one (1) successful standard fish trawl at a BASE Sampling Site suitable for the characterization of fish species composition, abundance and length.

5.1.2 Sample Collection Method Summary

A fish trawl is a funnel-shaped net that filters fish from the near bottom waters. Fish are herded by ground wire and doors into the mouth of the funnel where fish were captured. Fish are prevented from escaping over the top panel of the trawl by an overhanging panel. The net was towed for 10 + 2 minutes with a towing speed of 2-3 knots through the water against the prevailing current. Speed over the bottom was 1-3 knots.

All fish in the net were sorted by species and enumerated. All species considered to be rare, threatened, or endangered were processed immediately and released alive. Thirty individuals of a species (or all individuals if less than 30 were caught) were measured (fork length) to the nearest millimeter. Only fish data were recorded.

5.1.3 Beginning Sampling Date

22 July 1991

5.1.4 Ending Sampling Date

13 September 1991

5.1.5 Platform

Sampling was conducted from 8 m (24 ft), twin-engine Chesapeake style work boats.

5.1.6 Sampling Equipment

The trawl net was a funnel-shaped high rise sampling trawl with a 16-meter footrope with a chain sweep. The trawl net had 5 cm mesh wings and a 2.5 cm cod end.

5.1.7 Manufacturer of Equipment

Not Applicable

5.1.8 Key Variables

The total count of individuals of a taxon collected at a station, species identification information and individual length were recorded after sample collection.

5.1.9 Collection Method Calibration

The sampling gear did not require calibration. It required inspection for tears and proper assemblage.

5.1.10 Collection Quality Control

A trawl was considered void if one or more of the following conditions occurred:

1. A tow could not be completed because of hangdown, boat malfunction, vessel traffic, or major disruption of gear. However, a tow was considered acceptable if it was necessary to retrieve the net after at least eight minutes due to impending hazards, as long as the net was retrieved in the standard manner.

2. Boat speed or speed over the bottom was beyond the prescribed, acceptable range.

3. The cod-end of the net was not tied shut.

4. The trawl continued for more than twelve minutes or less than eight minutes.

5. The net was filled with mud or debris.

6. A portion of the catch was lost prior to processing.

7. The tow wire, bridle, headrope, footrope, or up and down lines parted.

8. The net was torn in a way that may have significantly altered the efficiency of the net.

If, due to repeated snags, a successful trawl could not be performed within 1 1/2 hours of starting, no further attempts were made and the Field Operations Center was notified.

Quality assurance audits were performed by qualified personnel to verify the enumeration of fish by the field crews. The accuracy goal for the fish abundance data was that the original results and the results of the field QA audit should agree within ten percent. In addition, the first one or two individual fish caught of any species were sent to the laboratory for taxonomic verification. All fish species should have been correctly identified. If these goals were not met, corrective actions included re-training the field crew and flagging the previous data from that crew for those species which had been misidentified. A random subset of the fish measured in the field was set aside for duplicate measurements by a second technician. The acceptable error in this procedure was + 5 mm. If this re-measurement procedure could not be followed due to logistical constraints, then quality assurance documentation of fish length was accomplished during field auditing.

The first two individuals of each species collected (except threatened or endangered species) were preserved and returned to NHEERL-AED for expert identification. Fish sent in were preserved for the EMAP fish reference collection to be used for future training. If corrections to the fish data base were necessary due to the mis-identification of a species, these corrections were carefully documented. Field crews were also notified of their misidentification to avoid any further ID problems for that species.

5.1.11 Sample Collection Method Reference

Strobel, C.J. and S.C. Schimmel. 1991. Environmental Monitoring and Assessment Program-Near Coastal Virginian Province. Field Operations and Safety Manual. U.S. EPA NHEERL-AED, Narragansett, RI. June 1991.

5.2 Data Preparation and Sample Processing

Physical samples were not collected for estimates of fish species composition and abundance; therefore, sample processing methods are not applicable.

6.   DATA MANIPULATIONS

6.1 Name of New of Modified Values

          REP_NUM   Trawl Replicate Number
          FSPECABN   Taxon Abundance (#/sample)
          FSPEC_MM   Mean Length (mm) of Ind. of the Taxon
          FSPECSTD   Standard Dev. of Length (mm)

6.2 Data Manipulation Description

Count of trawl number
Count of total individuals of a taxon collected at a station
Mean length (mm) of each taxon collected at a station
Standard deviation of the mean length

6.3 Data Manipulation Examples

FSPEC_MM (Mean Length of all Individuals of a Taxon) =
Sum of all lengths of a taxon / total number of individuals of a taxon

FSPECSTD (Standard Deviation of the Mean Length) =
The standard deviation was calculated when there was more than
 one length for a taxon

7.   DATA DESCRIPTION

7.1 Description of Parameters

#	Parameter SAS Name	Data Type	Len	Format	Parameter Label
1	STA_NAME	Char	8	8.	The Station Identifier
2	VST_DATE	Num	8	YYMMDD6.	The Date the Sample was Collected
3	REP_NUM	Num	8	2.	Nekton Trawl Replicate Number
4	SPECCODE	Char	8	$8.	EMAP Taxon Code
5	FSPECABN	Num	8	4.	Taxon Abundance (#/sample)
6	FSPEC_MM	Num	8	6.1	Mean Length (mm) of Ind. of the Taxon
7	FSPECSTD	Num	8	6.1	Standard Dev. of Length (mm)
8	FSPECBOD	Num	8	4.	# Body Path. on Ind. of the Taxon
9	FSPECBRN	Num	8	4.	# Branchial Path. on Ind. of the Taxon
10	FSPECBUC	Num	8	4.	# Buccal Path. on Ind. of the Taxon
11	FSPECOCU	Num	8	4.	# Eye Path. on Ind. of the Taxon

7.1.6 Precision to which values are reported

Total abundance is reported as a whole number.
Mean abundance and standard deviation (SD) are reported to 1 decimal
place.
Pathology values are not reported.

7.1.7 Minimum Value in Data Set

REP_NUM	1.0000000
FSPECABN	0
FSPEC_MM	39.6666667
FSPECSTD	0

7.1.8 Maximum Value in Data Set

```
REP_NUM          1.0000000
FSPECABN       580.0000000
FSPEC_MM       610.0000000
FSPECSTD       145.6639969
```

7.2 Data Record Example

7.2.1 Column Names for Example Records

STA_NAME   VST_DATE   REP_NUM   SPECCODE   FSPECABN   FSPEC_MM   FSPECSTD   FSPECBOD
FSPECBRN   FSPECBUC   FSPECOCU

7.2.2 Example Data Records

OBS	STA_NAME	VST_DATE	REP_NUM	SPECCODE	FSPECABN	FSPEC_MM	FSPECSTD	FSPECBOD
1	VA91-261	910803	1	CENTSTRI	7	146.9	10.7	.
2	VA91-261	910803	1	CITHMACR	2	112.5	3.5	.
3	VA91-261	910803	1	ETROMICR	10	95.9	6.0	.

	FSPECBRN	FSPECBUC	FSPECOCU
1	.	.	.
2	.	.	.
3	.	.	.

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude

-77 Degrees 18 Minutes 58.80 Decimal Seconds

8.2 Maximum Longitude

-70 Degrees 01 Minutes 00.00 Decimal Seconds

8.3 Minimum Latitude

36 Degrees 56 Minutes 24.60 Decimal Seconds

8.4 Maximum Latitude

42 Degrees 08 Minutes 00.00 Decimal Seconds

8.5 Name of area or region

Virginian Province

Stations were located in estuaries along the East Coast of the United
States from Cape Cod, Massachusetts, to Cape Henry, Virginia, at the
mouth of the Chesapeake Bay. The area includes the District of Columbia

and the States of Virginia, Maryland, New Jersey, Delaware, Pennsylvania, New York, Connecticut, Rhode Island and Massachusetts.

9. QUALITY CONTROL/QUALITY ASSURANCE

9.1 Measurement Quality Objectives

Measurement quality objectives were outlined in the Quality Assurance Project Plan (Valente and Schoenherr, 1991). Accuracy and precision goals are outlined below:

Fish Community Composition	Accuracy Goal	Completeness Goal
Counting	10 %	90 %
Taxonomic Identification	10 %	90 %
Length Determinations	+ 5 mm	90 %

9.2 Quality Assurance/Control Methods

Data from trawls which did not meet the requirements of a standard trawl were not included in this data set.

To further validate the identification of fish species, range checks were performed for species in the data base to assure that fish captured at a given station met certain criteria:

Salinity: For each station, bottom salinity was determined from the CTD cast and compared to the expected salinity range (based on historic data) for each species of fish captured at that station. Species records falling out of the salinity range were flagged.

Species location: A latitude range for each species captured by EMAP field crews was established based on historic data and fish keys. Each system that a particular species occurred in was compared to that range to determine inclusion. Latitudes where fish were reported captured were compared to expected latitudes for that species and flagged if there were discrepancies.

Length: Maximum length for each species was determined from fish keys. A QA length was calculated as 50% of the maximum length and outliers were flagged. Flagged data records were then investigated on a case by case basis to determine the cause of discrepancy and recommend a course of action.

10. DATA ACCESS

10.1 Data Access Procedures

A Data Request Package can be requested from a contact under Section 10.3. Data can be downloaded from the WWW site.

10.2 Data Access Restrictions

10.3 Data Access Contact Persons

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(401) 782-3030 (FAX)
paul.john@epamail.epa.gov

Data Librarian EMAP-Estuaries
U.S. EPA NHEERL-AED
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(401) 782-3030 (FAX)
hughes.melissa@epamail.epa.gov

10.4 Data Set Format

Data can be transmitted in a variety of formats derived from SAS data sets when a Data Request Form is submitted.

10.5 Information Concerning Anonymous FTP

Not accessible

10.6 Information Concerning WWW

Data can be downloaded from the WWW

10.7 EMAP CD-ROM Containing the Data Set

Data not available on CD-ROM.

11. REFERENCES

Holland, A.F., ed. 1990. Near Coastal Program Plan for 1990: Estuaries.
    EPA 600/4-90/033. U.S. EPA, Environmental Research Laboratory, Office
    of Research and Development, Narragansett, RI. November 1990.

Strobel, C.J., and S.C. Schimmel. 1991. Environmental Monitoring and
    Assessment Program-Near Coastal Component: 1991 Virginian Province
    Effort Field Operations and Safety Manual. U.S. EPA, NHEERL-AED,
    Narragansett, RI. June 1991.

Valente, R. and J. Schoenherr. 1991. Environmental Monitoring and Assessment
    Program-Near Coastal Virginian Province: Quality Assurance Project Plan.

    U.S. EPA, NHEERL-AED, Narragansett, RI. July 1991.

12.   TABLE OF ACRONYMS

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